



## Supplies for Organic Analysis

# LECO Corporation

## Delivering the Right Results

For over 70 years, industries around the world have trusted LECO Corporation to deliver technologically advanced solutions. Our state-of-the-art research and development center includes teams of engineers working together to create and test ideas that will be incorporated into your next instrument—an instrument designed to meet your needs. At our in-house manufacturing facility, quality drives production. From stamped metal parts to complex electronic assemblies, LECO produces most of the components needed in our products, allowing strict control over the entire manufacturing process in accordance with the quality standards of ISO-9001:2008. As a

final check before shipping, your instrument is thoroughly tested to assure quality and functionality.



*Aerial view of LECO's headquarters*

With dedicated support after the sale including highly trained Service Support personnel, Customer Training Courses, SmartLine<sup>®</sup> Remote Diagnostics, Preventive Maintenance Agreements, and a full line of consumables and spare parts, LECO stands by our commitment of helping you achieve the right results.

## Mobile Laboratories

LECO Corporation's unique mobile laboratories travel throughout North America, bringing the latest innovations in analytical instrumentation to your neighborhood. Take the opportunity to view our products in use as well as discuss everything from methods to maintenance with knowledgeable LECO technicians.

The LECO fleet includes four specially designed mobile laboratories for organic, materials characterization, metallographic, and spectrographic analyses. To find out more about LECO's Mobile Laboratories or to obtain the latest schedule, call 269-983-5531, 800-292-6141 (U.S. only), or log onto [www.leco.com](http://www.leco.com).



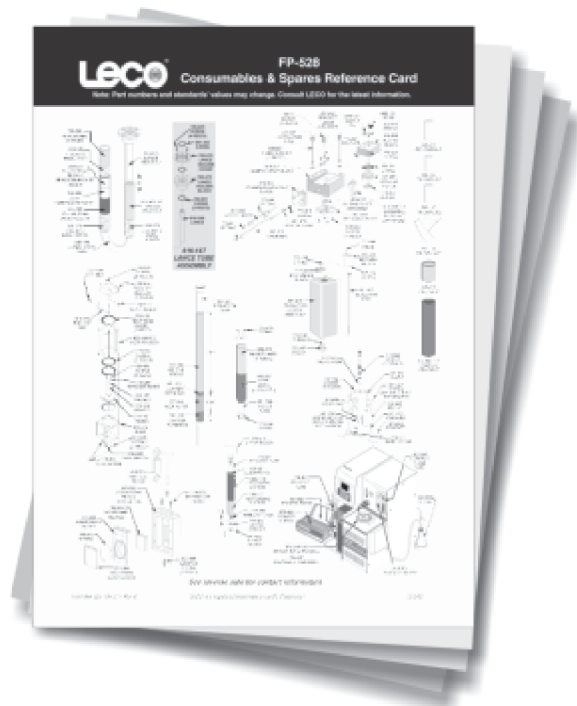
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To get the best results from your instrument, use only genuine LECO consumables!

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## Support Materials

A variety of support materials are available to customers of LECO products. Reference Cards offer exploded views of individual instruments, indicating precise locations of spare parts, necessary part numbers, and descriptions of consumable products. Material Safety Data Sheets (MSDS) are also available for a variety of chemical products offered through LECO. These materials may be obtained by contacting your LECO sales representative, or by downloading the latest version from our website, [www.leco.com](http://www.leco.com).



# Ordering Information/General Terms

## Ordering, Customer Assistance, and all Other Inquiries



### On-Line Ordering Now Available!

- Call **800-292-6141** to receive your free username and password
- Visit **www.lecodirect.com**
- Enter your log-in information and place your order

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#### Phone

800-292-6141 or  
269-985-5496



#### Mail

LECO Corporation  
3000 Lakeview Avenue  
St. Joseph, MI 49085



#### Fax

269-982-8977



#### Email

[sales@leco.com](mailto:sales@leco.com)  
for Purchase Orders or  
pricing information



[info@leco.com](mailto:info@leco.com)  
for general inquiries

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VISA, Mastercard, and American Express Accepted.



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## Terms and Conditions

- Terms: Net 30 days with approved credit.
- Prices shown are U.S. dollars, F.O.B. St. Joseph, Michigan. Freight charges are prepaid and added to the invoice.
- Sales taxes will be added where applicable.
- Returns must be approved in advance; re-stocking fee may be applied. Return Material Authorization (RMA) is required for all returns. Contact LECO for RMA information.
- Disclaimer: LECO products are intended for use by professional laboratory personnel who are familiar with the handling of these materials. Our products are not for use in household, drug, medical, or cosmetic applications. The buyer and/or user assumes full responsibility for the safe handling, storage, application, and proper disposal of all products ordered from this catalog.
- Complete TERMS and CONDITIONS are included with quotations and invoices.
- **Prices and part numbers are subject to change without notice.**

# Information for Elemental Analysis

LECO Corporation is the world leader in elemental determinators for various organic applications. Carbon, Hydrogen, Nitrogen/Protein, Sulfur, Oxygen, and Mercury may be determined in various types of samples including foods, feeds, oilseeds, meats, wet/dry milled products, fertilizers, petroleum products, pharmaceuticals, cements, coal/cokes, and other organic matter.

LECO's determinators are designed with specific capabilities to match the requirements of our customers. Many of the requirements that have been established include precision/accuracy, sample size, instrument range, and hardware/software robustness. In order to obtain the highest level of performance, we recommend that our customers define the following prior to operating our instruments.

## **Appropriate Sample Size for Your Application**

This is generally determined by the type of sample, instrument range, desired precision, level of robustness, sample holder, and methodology requirements. Typically, any elemental determination performed at a mass less than 50 mg is considered a microanalysis; whereas, an analysis performed with a mass of 50 mg to 1 g is considered a macroanalysis. See page 5 for more information on using the appropriate sample size.

## **Desired Precision and Accuracy for Your Application**

Based on standards and a realistic sample size. Appropriate sample size is determined by proven method requirements (for example ASTM or AOAC), level of robustness, and desired sample preparation. Standards are determined by availability and level of certification required for your laboratory. See page 14 for more information on the classification of standards.

## **Desired Sample Preparation**

The level of sample preparation is directly correlated to the heterogeneity of the sample. Most organic products may be analyzed as-is, from the industrial process. However, in order to improve performance on a difficult application, it may be required to pre-treat, pre-dry or pelletize the sample prior to its addition to a sample holder. See page 7 for more information on the types of sample containers/sample sizes that may be used for our elemental determinators.

## **Desired Level of Maintenance Commitment or Level of Robustness**

The amount of preventative maintenance performed on any elemental determinator is relative to the instrument's ability to handle the amount and type of sample that is analyzed. We have designed our instruments to maximize the level of robustness based on the lowest amount of involvement by the operator; however, there are several measures that can be taken to maximize the longevity of the instrument. Mainly, routine maintenance, appropriate sample size, and the use of proper consumable scrubbers for each application. See page 26 for more information on LECO's Preventative Maintenance Agreements (PMAs).

At LECO Corporation, we have several trained Application Scientists that are available to help guide you through any question you may have. Please feel free to contact our scientists at 800-292-6141 or 269-985-5496 for support on your application!

# Consumable Packs

Purchasing the highest quality consumables at the most affordable price is the fundamental goal of all instrumentation users. In addition, it is very important to maintain the proper inventory of consumables for your annual usage in order to prevent wasteful spending.

With over 15 to 30% discounts on typical list pricing and easily ordered with one part number, LECO's Consumable Packs provide specific consumables for our elemental determinators based on frequency of use and instrument model.

## TruEssential 1K Consumable Packs

These packages contain all the necessary consumables to perform 1000 analyses on the TruSpec<sup>®</sup>, TruMac<sup>™</sup> and FP-528 instrument models. Pricing is significantly reduced, and all items can be purchased with a single part number.

| <b>Part No.</b> | <b>Description</b>   |
|-----------------|--|
| 502-445-HAZ     | <i>TruEssential Pack (Small Tin Foils)</i><br>Includes: Anhydrone, N Catalyst, Lecosorb, Copper Sticks, Quartz Wool Strips, Reticulated Crucibles, and Small Tin Foil Cups |
| 502-446-HAZ     | <i>TruEssential Pack (Large Tin Foils)</i><br>Includes: Anhydrone, N Catalyst, Lecosorb, Copper Sticks, Quartz Wool Strips, Reticulated Crucibles, and Large Tin Foil Cups |
| 502-447-HAZ     | <i>TruEssential Pack (Small Gel Caps)</i><br>Includes: Anhydrone, N Catalyst, Lecosorb, Copper Sticks, Quartz Wool Strips, Reticulated Crucibles, and Small Gel Caps       |
| 502-448-HAZ     | <i>TruEssential Pack (Medium Gel Caps)</i><br>Includes: Anhydrone, N Catalyst, Lecosorb, Copper Sticks, Quartz Wool Strips, Reticulated Crucibles, and Medium Gel Caps     |
| 502-640-HAZ     | <i>TruEssential Pack (Tin Caps)</i><br>Includes: Anhydrone, N Catalyst, Lecosorb, Copper Sticks, Quartz Wool Strips, Reticulated Crucibles, and Tin Caps                   |
| 502-720-HAZ     | <i>TruMac 1K Consumable Pack (for Solid Samples)</i><br>Includes: Anhydrone, N Catalyst, Lecosorb, Copper Sticks, Steel Wool, Glass Wool, and Ceramic Boats                |
| 502-721-HAZ     | <i>TruMac 1K Consumable Pack (for Liquid Samples)</i><br>Includes: Anhydrone, N Catalyst, Lecosorb, Copper Sticks, Steel Wool, Glass Wool, and Ceramic Boat Liners         |

## 5K Consumable Packs

These packages contain all of the necessary consumables to perform 5000 analyses. Pricing is significantly reduced, and all items can be purchased with a single part number.

| <b>Part No.</b> | <b>Description</b>              |
|-----------------|---------------------------------|
| 502-621-HAZ     | TruSpec (w/Small tin foil cups) |
| 502-623-HAZ     | TruSpec (w/Large tin foil cups) |
| 502-624-HAZ     | TruSpec (w/Small gel caps)      |
| 502-622-HAZ     | TruSpec (W/Medium gel caps)     |
| 616-199-HAZ     | FP-528 (w/Small tin foil cups)  |
| 617-016-HAZ     | FP-528 (w/Small gel caps)       |
| 617-016-110-HAZ | FP-528 (w/Medium gel caps)      |
| 789-431-HAZ     | SC-144DR                        |
| 502-722-HAZ     | TruMac for Solid Samples        |
| 502-723-HAZ     | TruMac for Liquid Samples       |

# General Combustion Supplies

## Reagents/Packing Material

| <b>Part No.</b> | <b>Description</b>                     | <b>Contents</b>   |
|-----------------|--|---|
| 501-081         | Glass Wool                             | 454 g (1 lb.) box   |
| 501-170         | Rare Earth Copper Oxide                | 50 g bottle   |
| 501-171-HAZ     | Anhydron                               | 454 g (1 lb.) bottle  |
| 501-609-HAZ     | Furnace Reagent (Calcium Oxide/Kaolin) | 100 g bottle  |
| 502-049         | Nitrogen Catalyst                      | 50 g bottle   |
| 502-174-HAZ     | Lecosorb (20/30 Mesh)                  | 500 g bottle  |
| 502-177         | Quartz Wool                            | 50 g package  |
| 502-188         | Alumina Oxide Pellets                  | 200 g bottle  |
| 502-189         | Copper Sticks                          | 100 g ampule  |
| 502-190         | Copper Oxide Wire                      | 100 g bottle  |
| 502-196         | Carbon Black Powder                    | 10 g bottle   |
| 502-226         | Silver Vanadate                        | 10 g bottle   |
| 502-228         | Graphite Pad                           | One 2 <sup>1</sup> / <sub>4</sub> " x 2 <sup>1</sup> / <sub>4</sub> " pad |
| 502-283         | Sorbites® (TruSpec Micro)              | 500 per package   |
| 502-295         | Copper Turnings                        | 100 g bottle  |
| 502-304         | Copper Sticks                          | 100 g bottle  |
| 502-304-500     | Copper Sticks                          | 500 g bottle  |
| 502-310         | Steel Wool                             | 454 g (1 lb.) package   |
| 502-351         | Halogen Scrubber                       | 50 g bottle   |
| 502-359         | Magnesium Oxide Reagent                | 200 g bottle  |
| 502-644         | Furnace Reagent, Micro                 | 60 g bottle   |
| 608-379         | Quartz Wool Strips                     | Ten 15-inch strips  |
| 617-441         | Afterburner Filter for TruSpec         | 1 each  |
| 763-265         | Glass Wool                             | 227 g (1/2 lb.) package   |
| 769-608-HAZ     | Antimony                               | 200 g bottle  |
| 769-610         | F/Cl Absorbent Material                | 225 g bottle  |

## Accelerators/Combustion Aids

| <b>Part No.</b> | <b>Description</b>     | <b>Contents</b>      |
|-----------------|------------------------|----------------------|
| 501-426         | COM-AID™ (For Solids)  | 454 g (1 lb.) bottle |
| 501-427         | COM-AID™ (For Liquids) | 454 g (1 lb.) bottle |
| 501-441         | Sucrose                | 50 g bottle          |
| 501-636-HAZ     | Vanadium Pentoxide     | 250 g bottle         |
| 502-301         | Tungsten Trioxide      | 125 g bottle         |
| 502-321         | COM-CAT™               | 250 g bottle         |

# Sample Size

## Using the Appropriate Sample Size

The amount of sample that may be used as the appropriate sample size for certain matrices is governed by the need to achieve certain limits of quantitation with respect to the determined content of the sample.

According to work done by M.J. Gardner in "Sample Heterogeneity and Analytical Precision: How Much Sample Should I Take for Analysis"<sup>1</sup>, the uncertainty for different sample sizes diminishes with larger sample sizes; however, the level of improvements in precision reach a point of limited return beyond 0.5 g (500 mg) for samples of higher elemental concentration and 1 g (1000 mg) for samples of lower elemental concentration.

Assuming ~63  $\mu\text{m}$  particle size on a powdered sample at an elemental concentration of 10%, Gardner determined the following uncertainties based on sample size.

| Sample Size (mg) | 90% probability interval ( $\pm\%$ ) |
|------------------|--------------------------------------|
| 100              | 1.1                                  |
| 200              | 0.8                                  |
| 500              | 0.5                                  |
| 1000             | 0.4                                  |

Assuming ~63  $\mu\text{m}$  particle size on a powdered sample at an elemental concentration of 1%, Gardner determined the following uncertainties based on sample size.

| Sample Size (mg) | 90% probability interval ( $\pm\%$ ) |
|------------------|--------------------------------------|
| 100              | 3.7                                  |
| 200              | 2.6                                  |
| 500              | 1.6                                  |
| 1000             | 1.1                                  |
| 2000             | 0.8                                  |

It is best to contact our Applications Laboratory for suggestions on sample size for your matrices. Knowing the appropriate sample size for your desired precision is imperative when lengthening the maintenance interval on an elemental determinator.

- For standard feed, milling, and coal applications, use 150 to 250 mg for <5% RSD
- For standard food, petfood, and rendered products, use 250 to 500 mg for <5% RSD
- For soil, meat, and low-level concentration samples, use 500 to 1000 mg for <5% RSD
- For pharmaceutical applications, use 1 to 20 mg for <5% RSD

<sup>1</sup>Analytical Proceedings including Analytical Communications, March 1995, Vol 32 Pg 115-116

# Capsules and Crucibles

Refer to pages 8 and 9 for a visual guide to selecting the correct replacement capsule or crucible.

## AC500/AC600

| Part No. | Description | Contents       |
|----------|-------------|----------------|
| 774-204  | Crucible    | 10 per package |

## AF700

| Part No.    | Description                           | Contents        |
|-------------|---------------------------------------|-----------------|
| 625-501-662 | Ash Cone Tray (Dual-Sided, 5-6 Place) | 100 per package |

## AMA254

| Part No.    | Description       | Contents      |
|-------------|-------------------|---------------|
| 614-822-102 | Small Nickel Boat | 1 per package |
| 614-822-114 | Large Nickel Boat | 1 per package |

## FP-528 (See TruSpec, FP-528)

### SC-144DR/S-144DR/C-144

| Part No.    | Description   | Contents        |
|-------------|---------------|-----------------|
| 529-204     | Ceramic Boats | 50 per package  |
| 529-204-250 | Ceramic Boats | 250 per package |

## SC632, TruSpec S

| Part No.    | Description   | Contents        |
|-------------|---|-----------------|
| 528-203-250 | Ceramic Boats, for macrosamples/horizontal-loading furnaces | 250 per package |
| 529-203     | Ceramic Boats, for macrosamples/horizontal-loading furnaces | 100 per package |

## TGA701

| Part No. | Description   | Contents        |
|----------|---|-----------------|
| 502-335  | Foil Liners, for lining TGA Crucibles (621-331)                                       | 500 per package |
| 529-048  | Covers, for 529-047 Large Ceramic Crucibles   | 5 per package   |
| 621-331  | Large Ceramic Crucibles (529-048 Cover), for thermogravimetric and proximate analyses | 5 per package   |

## TruMac

| Part No.    | Description   | Contents        |
|-------------|---|-----------------|
| 502-343     | Nickel Boat Liner   | 100 per package |
| 528-203-250 | Ceramic Boats, for macrosamples/horizontal-loading furnaces | 250 per package |
| 529-203     | Ceramic Boats, for macrosamples/horizontal-loading furnaces | 100 per package |

# Capsules and Crucibles

Refer to pages 8 and 9 for a visual guide to selecting the correct replacement capsule or crucible.

## TruSpec, FP528 Capsules and Cups

Note: In order to extend the interval between ash removal, it is recommended to use the container with the lowest ash content.

| Part No.    | Description                                    | Sample Size Range | Sample Type  | Ash Content | Applicable Instruments  | Contents |
|-------------|--|-------------------|--------------|-------------|-------------------------|----------|
| 502-338     | Small Gel Caps                                 | 50-250 mg         | Solid        | Low         | TruSpec N, FP528        | 400/pkg  |
| 502-382     | Medium Gel Caps                                | 50-500 mg         | Solid        | Low         | TruSpec N, FP528        | 400/pkg  |
| 502-810     | Large Gel Caps                                 | 50-1000 mg        | Solid        | Low         | TruSpec N               | 400/pkg  |
| 502-186-100 | Small Tin Foil Cups<br>(100/btl - 502-186-200) | 50-350 mg         | Solid        | Med         | TruSpec N/CN/CHN, FP528 | 1000/pkg |
| 502-397-400 | Large Tin Foil Cups<br>(100/pkg - 502-397)     | 50-1000 mg        | Solid        | High        | TruSpec N/CN/CHN        | 400/pkg  |
| 502-040-100 | Small Tin Capsules<br>(100/btl - 502-040)      | 50-400 mg         | Solid/Liquid | Med         | TruSpec N/CN/CHN, FP528 | 1000/btl |
| 502-167     | Medium Tin Capsules                            | 50-750 mg         | Solid/Liquid | High        | TruSpec N/CN/CHN        | 100/btl  |
| 502-818     | Large Tin Capsules                             | 50-1000 mg        | Solid/Liquid | Med         | TruSpec N/CN/CHN        | 50/btl   |

## TruSpec, FP528 Crucibles

| Part No.    | Description            | Sample Type  | Contents |
|-------------|------------------------|--------------|----------|
| 614-961-110 | Reticulated Crucible   | Solid/Liquid | 10/pkg   |
| 617-605     | Reticulated Crucible   | Liquid       | 10/pkg   |
| 780-899     | Honeycomb Ceramic Stop |              | 1/pkg    |

## TruSpec, FP528 Capsules for Volatile Samples (ASTM D5291)

| Part No. | Description                               | Contents |
|----------|---|----------|
| 501-571  | Copper Capsules (seal w/502-008 Tin Plug) | 100/pkg  |
| 502-008  | Tin Plugs for Sealing 501-571             | 100/pkg  |

## TruSpec Micro CHNS/O Capsules

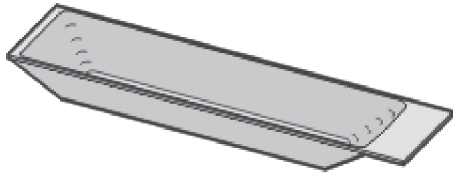
| Part No. | Description                             | Contents |
|----------|---|----------|
| 502-206  | Silver Capsules for CHNS Micro Analysis | 1000/pkg |
| 601-963  | Tin Capsules for CHN/O Micro Analysis   | 1000/pkg |

## TruSpec Micro CHNS/O Crucibles

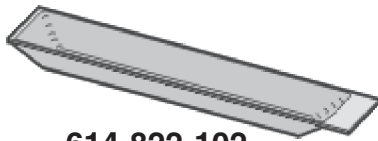
| Part No.    | Description                                       | Contents |
|-------------|---|----------|
| 502-489     | Micro Reticulated Crucible (Micro CHNS Analysis)  | 10/pkg   |
| 614-961-110 | Reticulated Crucible                              | 10/pkg   |
| 625-511-154 | Reticulated Crucible for Primary Furnace Reagents | 5/pkg    |
| 606-026     | Graphite Crucible for Oxygen Analysis             | 10/pkg   |

# Capsules and Crucibles

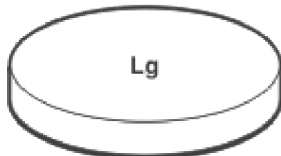
Most commonly used items represented.



**614-822-114**  
Large Nickel Boat  
(AMA254 only)



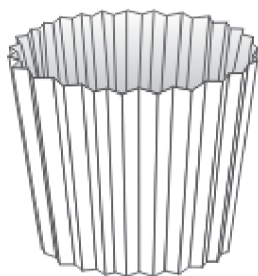
**614-822-102**  
Small Nickel Boat  
(AMA254 only)



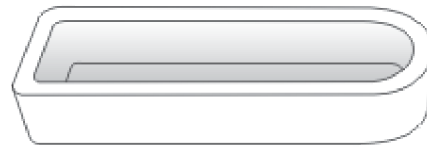
**529-048**  
Ceramic Cover



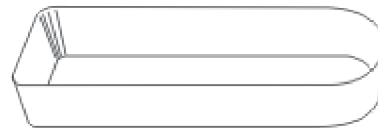
**621-331**  
Ceramic Crucible



**502-335**  
Foil Liner  
(for 621-331 Crucible only)



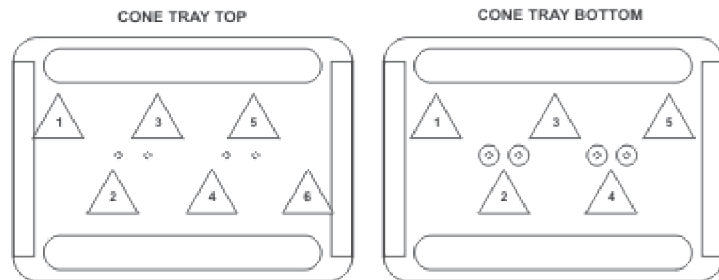
**529-203**  
**528-203-250**  
Ceramic Boat  
(TruSpec S, TruMac, S/SC632)



**502-343**  
Nickel Boat Liner



**529-204** Ceramic Boat (SC-144 Series)  
**529-204-250** Ceramic Boat (SC-144 Series)



**625-501-662** Ash Cone Tray  
(dual Sided 5/6 Place) 100 Pk (AF700)



**774-204**  
Crucible  
(AC-Series)

# Capsules and Crucibles

Most commonly used items represented.



**502-040**  
**502-040-100**  
Tin Capsule  
(small)



**502-167**  
Tin Capsule  
(medium)



**502-818**  
Tin Capsule  
(large)



**502-338**  
Gel Capsule  
(small)



**502-382**  
Gel Capsule  
(medium)



**502-810**  
Gel Capsule  
(large)



**601-963**  
Tin Capsule  
(micro)



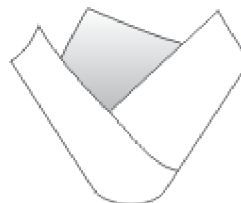
**502-206**  
Silver  
Capsule  
(micro)



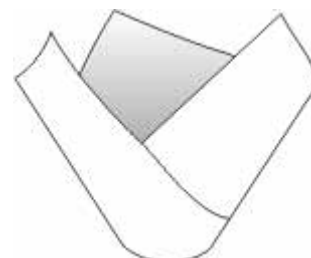
**502-008**  
Tin Plug



**501-571**  
Copper  
Capsule



**502-186-200** (small)  
**502-186-100** (small)  
Tin Foil Cup



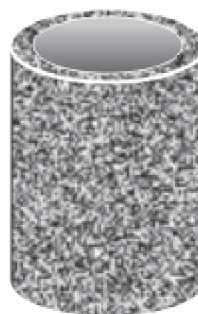
**502-397** (large)  
**502-397-400** (large)  
Tin Foil Cup



**614-961-110**  
Porous Reticulated  
Crucible for solid samples  
(FP-528 & TruSpec)



**617-605**  
Porous Reticulated  
Crucible for liquid samples  
(FP-528 & TruSpec)



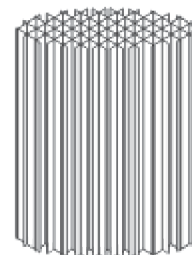
**625-511-154**  
Porous Reticulated  
Crucible



**502-489**  
Micro Porous  
Reticulated  
Crucible



**606-026**  
Graphite  
Crucible



**780-899**  
Honeycomb  
Ceramic  
Stop

# Combustion Tubes and Glassware

Refer to pages 12 and 13 for a visual guide to selecting the correct replacement tubes and glassware.

## AF700

| <b>Part No.</b> | <b>Description</b> |
|-----------------|--------------------|
| 619-316         | Filter Tube        |
| 625-501-391     | Furnace Tube       |
| 625-501-392     | Gas Inlet Tube     |
| 625-501-394     | D-Tube             |

## AMA254

| <b>Part No.</b> | <b>Description</b> |
|-----------------|--------------------|
| 614-822-105     | Catalyst Tube      |
| 614-822-110     | Amalgamator        |

## FP-528 (See TruSpec, FP-528)

## SC-144DR/S-144DR/C-144

| <b>Part No.</b> | <b>Description</b>    |
|-----------------|-----------------------|
| 606-327         | Reagent Tube          |
| 616-051         | Purge Tube            |
| 616-070         | Inner Combustion Tube |
| 616-086         | Boat Stop Ceramic     |
| 616-089         | Outer Combustion Tube |

## SC632, TruSpec S

| <b>Part No.</b> | <b>Description</b>      |
|-----------------|-------------------------|
| 606-308         | Boat Stop Ceramic       |
| 606-309         | Outer Combustion Tube   |
| 606-313         | Inner Combustion Tube   |
| 619-455         | Reagent Tube            |
| 625-401-351     | Lance Tube, Autoloader  |
| 625-401-352     | Lance Tube, Manual Load |

# Combustion Tubes and Glassware

Refer to pages 12 and 13 for a visual guide to selecting the correct replacement tubes and glassware.

## TruMac

| <b>Part No.</b> | <b>Description</b>                             |
|-----------------|--|
| 606-308         | Boat Stop Ceramic                              |
| 606-327         | Primary Filter Tube                            |
| 617-548         | Secondary Filter/Incoming Helium Scrubber Tube |
| 619-154         | Reduction Tube                                 |
| 619-268         | Aliquot Dose Scrubber Tube                     |
| 625-601-554     | Outer Combustion Tube                          |
| 625-601-555     | Inner Combustion Tube                          |
| 625-602-187     | Lance Tube                                     |

## TruSpec, FP-528

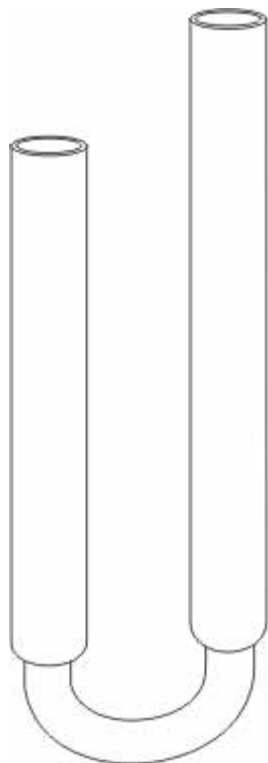
| <b>Part No.</b> | <b>Description</b>                        | <b>Used On</b>  |
|-----------------|---|-----------------|
| 601-390         | Furnace Filter Tube                       | TruSpec, FP-528 |
| 614-962         | Lance Tube                                | FP-528          |
| 616-108         | U-Shaped Combustion Tube                  | FP-528          |
| 616-146         | Lance Tube                                | TruSpec         |
| 617-548         | Reagent Tube                              | TruSpec         |
| 619-065         | U-Shaped Combustion Tube with flat bottom | TruSpec         |
| 619-154         | Catalyst Heater Tube                      | TruSpec         |
| 619-268         | High Sensitivity Reagent Tube             | TruSpec         |
| 619-316         | Extended-Use Glass Filter Tube            | TruSpec         |
| 771-030         | Bubble Tube                               | FP-528          |
| 775-601         | Reagent Tube                              | FP-528          |
| 780-899         | Honeycomb Ceramic Crucible Stop           | FP-528          |

## TruSpec Micro O

| <b>Part No.</b> | <b>Description</b>    | <b>Used On</b>     |
|-----------------|-----------------------|--------------------|
| 608-065         | Lance Tube            | TruSpec Micro O    |
| 608-129         | Outer Combustion Tube | TruSpec Micro O    |
| 608-130         | Inner Combustion Tube | TruSpec Micro O    |
| 619-425         | Filter Tube/Anhydron  | TruSpec Micro CHNS |
| 619-774         | Lance Tube            | TruSpec Micro CHNS |
| 619-776         | Reagent Tube          | TruSpec Micro CHNS |
| 619-777         | Middle Tube           | TruSpec Micro CHNS |
| 775-601         | Reagent Tube          | TruSpec Micro O    |

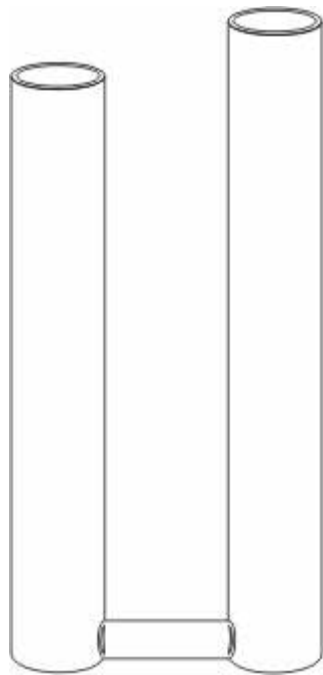
# Combustion Tubes and Glassware

Most commonly used items represented.



**616-108**  
U-Shaped  
Combustion Tube  
*(FP-528 Only)*

12.15"



**619-065**  
U-Shaped Combustion Tube  
w/Flat Bottom  
*(TruSpec Only)*

11.25"



**619-268**  
High Sensitivity  
Reagent Tube

Glass

10.75"



**617-548**  
Reagent Tube

Glass

10.75"



**619-154**  
Catalyst  
Heater Tube  
*(TruSpec Only)*

Quartz

14.25"



**601-390**  
Furnace Filter  
Tube

Glass

6"



**771-030**  
Bubble  
Tube

Glass

4"



**775-601**  
Reagent  
Tube

Glass

6"



**614-822-105**  
Calalyst Tube  
*(AMA254 Only)*



**619-425**  
Filter Tube

5.30"

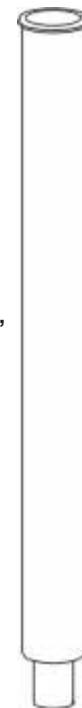


**614-822-110**  
Amalgamator  
*(AMA254 Only)*



**619-455**  
Reagent  
Tube

12.00"

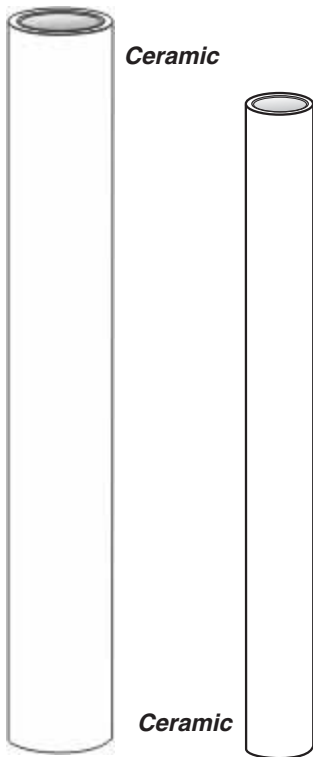


**617-548**  
Reagent  
Tube

11.39"

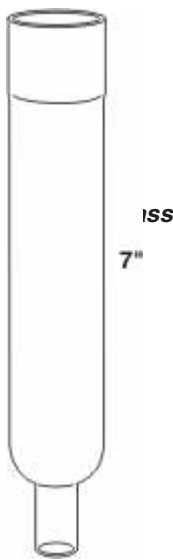
# Combustion Tubes and Glassware

Most commonly used items represented.

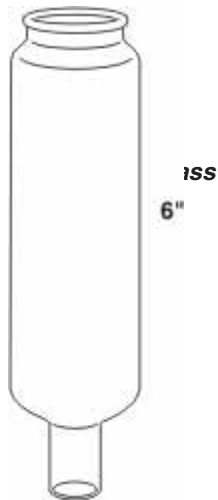


**608-129**  
Outer  
Combustion  
Tube  
(TruSpec Micro O)

**608-130**  
Inner  
Combustion  
Tube  
(TruSpec Micro O)



**606-327**  
Reagent  
Tube



**619-316**  
Large Volume  
Reagent  
Tube



**606-313** Inner Combustion Tube (SC632, TruSpec S)



**606-309** Outer Combustion Tube (SC632, TruSpec S)



**616-070** Inner Combustion Tube (SC-144 Series)



**616-089** Outer Combustion Tube (SC-144 Series)



**625-601-554** Outer Combustion Tube (TruMac) 15.62"



**625-601-555** Inner Combustion Tube (TruMac) 14.62"



**616-086**  
Boat Stop  
(SC144-Series)



**606-308**  
Boat Stop  
(SC632, TruSpec S, TruMac)



**625-501-391** Furnace Tube (AF700)



**625-501-394** D-Tube (AF700)



**625-501-392** Gas Inlet Tube (AF700)

# Standards

Numbers listed represent an average from multiple lots or an expected range for a particular lot's average. Call 800-292-6141 for exact chemistry and availability.

## Pure Chemical Set-Up Standards

| Part No.    | Description          | % C         | % H       | % N               | % O   | % S   | BTU/lb. | Contents        |
|-------------|----------------------|-------------|-----------|-------------------|-------|-------|---------|-----------------|
| 501-034     | Calcium Carbonate    | 12.0        | —         | —                 | —     | —     | —       | 50 g            |
| 501-048     | Potassium Biphtalate | 47.05       | 2.47      | —                 | 31.34 | —     | —       | 20 g            |
| 501-050     | Nicotinic Acid       | 58.53       | 4.09      | 11.38             | —     | —     | —       | 15 g            |
| 501-053     | Acetanilide          | 71.09       | 6.71      | 10.36             | 11.84 | —     | —       | 10 g            |
| 501-441     | Sucrose              | 42.10       | 6.48      | —                 | 51.42 | —     | —       | 50 g            |
| 502-085     | Zinc Sulfide         | —           | —         | —                 | —     | 32.91 | —       | 50 g            |
| 502-092     | EDTA                 | 40.80–41.20 | 5.46–5.54 | 9.52–9.60         | —     | —     | —       | 50 g            |
| 502-092-250 | EDTA                 | 40.80–41.20 | 5.46–5.54 | 9.52–9.60         | —     | —     | —       | 250 g           |
| 502-101     | Durene               | 89.49       | 10.51     | —                 | —     | —     | —       | 10 g            |
| 502-184     | Benzoic Acid Powder  | 68.85       | 4.95      | —                 | 26.20 | —     | 11373   | 10 g            |
| 502-203     | Stearic Acid         | 75.99       | 12.76     | —                 | 11.25 | —     | —       | 5 g             |
| 502-204     | Dinitrobenzoic Acid  | 39.63       | 1.90      | 13.21             | 45.26 | —     | —       | 5 g             |
| 502-205     | Caffeine             | 49.48       | 5.19      | 28.85             | 16.48 | —     | —       | 5 g             |
| 502-207     | Cystine              | 29.99       | 5.03      | 11.66             | 26.63 | 26.69 | —       | 5 g             |
| 502-209     | Sulfamethazine       | 51.78       | 5.07      | 20.13             | 11.50 | 11.52 | —       | 5 g             |
| 502-211     | Glycine              | 32.00       | 6.71      | 18.66             | 42.63 | —     | —       | 50 g            |
| 502-298     | Sulfamethazine       | 51.78       | 5.07      | 20.13             | 11.50 | 11.52 | —       | 25 g            |
| 502-601     | Nitrogen (Liquid)    | —           | —         | 0.0100% (100 ppm) | —     | —     | —       | (5) 10 ml vial  |
| 502-602     | Nitrogen (Liquid)    | —           | —         | 0.1% (1000 ppm)   | —     | —     | —       | (5) 10 ml Vial  |
| 502-641     | Phenylalanine        | 65.4        | 6.7       | 8.5               | —     | —     | —       | 5 g             |
| 502-642     | Phenylalanine        | 65.4        | 6.7       | 8.5               | —     | —     | —       | 50 g            |
| 774-208-150 | Benzoic Acid         | 68.85       | 4.95      | —                 | 26.20 | —     | 11373   | (50) 1 g t/plt. |

## Synthetic Carbon Set-Up Standards

| Part No. | Description      | % C       | Contents |
|----------|------------------|-----------|----------|
| 502-632  | Synthetic Carbon | 0.1–0.2   | 50 g     |
| 502-630  | Synthetic Carbon | 0.40–0.60 | 50 g     |
| 502-029  | Synthetic Carbon | 0.90–1.10 | 50 g     |
| 502-030  | Synthetic Carbon | 4.90–5.10 | 50 g     |

## Natural Matrix Set-Up Standards

| Part No.    | Description    | % C       | % H     | % N       | % S       | Contents |
|-------------|----------------|-----------|---------|-----------|-----------|----------|
| 501-561-150 | Soy Flour      | —         | —       | 8.0–10.0  | —         | 50 g     |
| 501-563-150 | Corn Flour     | —         | —       | 0.8–1.6   | —         | 50 g     |
| 502-055     | Orchard Leaves | 44.0–52.0 | 5.7–6.5 | 2.0–2.8   | 0.15–0.25 | 20 g     |
| 502-082     | Tobacco Leaves | 35.0–47.0 | 4.0–7.0 | 2.0–4.0   | 0.3–0.8   | 20 g     |
| 502-272     | Corn Gluten    | 51.0–53.0 | 7.0–7.5 | 11.0–12.0 | 0.75–1.0  | 50 g     |
| 502-273     | Alfalfa        | 45.0–47.0 | 5.5–6.5 | 2.5–5.0   | 0.25–0.35 | 50 g     |
| 502-274     | Wheat Flour    | 44.0–46.0 | 6.0–7.0 | 2.5–3.5   | 0.15–0.25 | 50 g     |
| 502-275     | Rye Flour      | 43.5–45.5 | 6.0–7.0 | 1.5–2.5   | 0.10–0.20 | 50 g     |
| 502-276     | Oat Meal       | 45.0–47.0 | 6.0–7.0 | 2.5–3.5   | 0.15–0.25 | 50 g     |
| 502-277     | Barley         | 45.0–47.0 | 6.0–7.0 | 1.0–3.0   | 0.10–0.20 | 50 g     |
| 502-278     | Rice Flour     | 43.0–45.0 | 6.0–7.0 | 1.0–3.0   | 0.10–0.20 | 50 g     |

# Standards

Numbers listed represent an average from multiple lots or an expected range for a particular lot's average. Call 800-292-6141 for exact chemistry and availability.

## Soils and Ore Tailings Set-Up Standards

| Part No. | Description | % C       | % H     | % N       | % S       | Contents |
|----------|-------------|-----------|---------|-----------|-----------|----------|
| 502-062  | Soil        | 0.75–1.25 | 0.3–0.5 | 0.09–0.15 | 0.015–0.3 | 65 g     |
| 502-308  | Soil        | 2.5–3.5   | —       | 0.2–0.3   | 0.015–0.3 | 65 g     |
| 502-309  | Soil        | 10.0–14.0 | —       | 0.3–1.0   | 0.015–0.3 | 65 g     |
| 502-814  | Soil        | 35–45     | 0.1–0.5 | 8.5       | —         | 65 g     |
| 502-318  | Ore Tailing | ≤2        | —       | —         | ≤2        | 25 g     |
| 502-319  | Ore Tailing | 1–5       | —       | —         | 1–5       | 25 g     |
| 502-320  | Ore Tailing | 2–6       | —       | —         | 2–6       | 25 g     |
| 502-372  | Ore Tailing | 3–10      | —       | —         | 3–10      | 25 g     |
| 502-491  | Ore Tailing | 7–15      | —       | —         | 7–15      | 25 g     |

## Coal and Coke Reference Materials

| Part No. | Description | % Sulfur | Contents |
|----------|-------------|----------|----------|
| 502-670  | Coal        | ~0.5     | 50 g     |
| 502-671  | Coal        | ~1.0     | 50 g     |
| 502-672  | Coal        | ~2.0     | 50 g     |
| 502-673  | Coal        | ~3.0     | 50 g     |
| 502-674  | Coal        | ~4.5     | 50 g     |

| Part No. | Description         | % Sulfur | % Volatile | % Ash | % C   | % H  | % N  | BTU/lb.* | Contents |
|----------|---------------------|----------|------------|-------|-------|------|------|----------|----------|
| 502-680  | Coal Prox Plus Low  | ~0.3     | ~17.0      | ~11.0 | ~81.0 | ~4.0 | ~1.0 | ~13893   | 50 g     |
| 502-681  | Coal Prox Plus Med. | ~1.3     | ~32.0      | ~9.0  | ~78.0 | ~5.0 | ~1.5 | ~13892   | 50 g     |
| 502-682  | Coal Prox Plus High | ~0.5     | ~41.0      | ~6.0  | ~75.0 | ~5.0 | ~1.5 | ~13019   | 50 g     |
| 502-683  | Met Coke Prox Plus  | ~0.75    | ~1.0       | ~10.0 | ~87.0 | ~0.3 | ~1.0 | ~12718   | 50 g     |
| 502-684  | Pet Coke Prox Plus  | ~5.5     | ~13.4      | ~0.3  | ~87.0 | ~3.6 | ~1.5 | ~15367   | 50 g     |

\*for information purposes only

| Part No. | Description                     | ppm Hg | % S  | % C  | Contents |
|----------|---------------------------------|--------|------|------|----------|
| 502-499  | BCR 143r Mercury in Dry Sludge  | ~1.1   | —    | —    | 50 g     |
| 502-649  | NIST 2781 Mercury in Dry Sludge | ~3.64  | —    | —    | 40 g     |
| 502-685  | LECO Coal RM Low Hg             | ~0.05  | ~1.0 | —    | 50 g     |
| 502-686  | LECO Coal RM Medium Hg          | ~0.10  | ~4.2 | —    | 50 g     |
| 502-687  | LECO Coal RM High Hg            | ~0.14  | ~2.2 | —    | 50 g     |
| 502-813  | LECO Fly Ash                    | ~0.35  | ~1.0 | ~1.0 | 20 g     |

## TGA Check Sample

| Part No. | Description     | % Weight Loss at 200°C | % Weight Loss at 400°C | % Weight Loss at 850°C | Contents |
|----------|-----------------|------------------------|------------------------|------------------------|----------|
| 502-091  | Calcium Oxalate | 12                     | 19                     | 30                     | 50 g     |

## Metal Wire Standards for AF700

| Part No. | Description | Melting Point | Contents |
|----------|-------------|---------------|----------|
| 502-496  | Gold Wire   | 1063°C        | 6 inch   |
| 501-951  | Nickel Wire | 1452°C        | 6 inch   |

# Standards

Numbers listed represent an average from multiple lots or an expected range for a particular lot's average. Call 800-292-6141 for exact chemistry and availability.

## ARMI Certified Reference Materials

| Part Number | Description                         | Contents        |
|-------------|-------------------------------------|-----------------|
| 502-383     | Coal CRM Sulfur ~0.25%              | 50 g (1.75 oz.) |
| 502-384     | Coal CRM Sulfur ~0.75%              | 50 g (1.75 oz.) |
| 502-385     | Coal CRM Sulfur ~1%                 | 50 g (1.75 oz.) |
| 502-386     | Coal CRM Sulfur ~1.5%               | 50 g (1.75 oz.) |
| 502-387     | Coal CRM Sulfur ~3%                 | 50 g (1.75 oz.) |
| 502-388     | Coal CRM Sulfur ~5%                 | 50 g (1.75 oz.) |
| 502-389     | Residual Fuel Oil CRM Sulfur ~0.1%  | 118 ml (4 oz.)  |
| 502-390     | Residual Fuel Oil CRM Sulfur ~0.5%  | 118 ml (4 oz.)  |
| 502-391     | Residual Fuel Oil CRM Sulfur ~1%    | 118 ml (4 oz.)  |
| 502-392     | Residual Fuel Oil CRM Sulfur ~2%    | 118 ml (4 oz.)  |
| 502-393     | Residual Fuel Oil CRM Sulfur ~3%    | 118 ml (4 oz.)  |
| 502-394     | Residual Fuel Oil CRM Sulfur ~4.5%  | 118 ml (4 oz.)  |
| 502-417     | White Mineral Oil CRM Sulfur ~0.01% | 118 ml (4 oz.)  |
| 502-418     | White Mineral Oil CRM Sulfur ~0.05% | 118 ml (4 oz.)  |
| 502-419     | White Mineral Oil CRM Sulfur ~0.10% | 118 ml (4 oz.)  |
| 502-420     | White Mineral Oil CRM Sulfur ~0.50% | 118 ml (4 oz.)  |
| 502-421     | White Mineral Oil CRM Sulfur ~1%    | 118 ml (4 oz.)  |
| 502-422     | White Mineral Oil CRM Sulfur ~2%    | 118 ml (4 oz.)  |
| 502-423     | White Mineral Oil CRM Sulfur ~3%    | 118 ml (4 oz.)  |
| 502-424     | #2 Diesel Fuels CRM Sulfur ~0.01%   | 118 ml (4 oz.)  |
| 502-425     | #2 Diesel Fuels CRM Sulfur ~0.03%   | 118 ml (4 oz.)  |
| 502-426     | #2 Diesel Fuels CRM Sulfur ~0.05%   | 118 ml (4 oz.)  |
| 502-427     | #2 Diesel Fuels CRM Sulfur ~0.10%   | 118 ml (4 oz.)  |
| 502-428     | #2 Diesel Fuels CRM Sulfur ~0.50%   | 118 ml (4 oz.)  |
| 502-429     | #2 Diesel Fuels CRM Sulfur ~1.0%    | 118 ml (4 oz.)  |
| 502-430     | #2 Diesel Fuels CRM Sulfur ~2.0%    | 118 ml (4 oz.)  |
| 502-431     | #2 Diesel Fuels CRM Sulfur ~3.0%    | 118 ml (4 oz.)  |
| 502-432     | #2 Diesel Fuels CRM Sulfur ~4.5%    | 118 ml (4 oz.)  |

| Part No. | Description                 | % Sulfur | % Volatile | % Ash | % C    | % H    | % N   | BTU/lb. | Contents       |
|----------|-----------------------------|----------|------------|-------|--------|--------|-------|---------|----------------|
| 502-801  | 0.25% S in Coal Prox-X CRM  | 0.28     | 43.0       | 5.79  | 70.17  | 4.37   | 0.9   | 11770** | 50 g           |
| 502-802  | 0.75% S in Coal Prox-X CRM  | 0.78     | 40.97      | 8.57  | 71.08  | 4.56   | 1.08  | 12017** | 50 g           |
| 502-803  | 1.50% S in Coal Prox-X CRM  | 1.71     | 34.3       | 18.76 | 67.27  | 4.54   | 1.39  | 12060** | 50 g           |
| 502-804  | 4.50% S in Coal Prox-X CRM  | 4.71     | 38.5       | 16.82 | 64.02* | 4.67*  | 1.24* | 11639** | 50 g           |
| 502-805  | 5.00% S in Coal Prox-X CRM  | 5.41     | 32.29      | 22.34 | 64.19  | 4.21   | 1.1   | 11622** | 50 g           |
| 502-806  | 7.00% S in Raw Pet Coke CRM | 6.73     | 10.63      | 0.32  | 87.53* | 3.36*  | 1.73* | 15024** | 50 g           |
| 502-807  | 1.50% S in Raw Pet Coke CRM | 1.54     | 9.7        | 0.17  | 92.7*  | 3.64*  | 1.56* | 15681** | 50 g           |
| 502-812  | EDTA CRM                    | —        | —          | —     | ~41.1  | ~5.55  | ~9.56 | —       | 50 g           |
| 502-815  | Mineral Oil CRM             | —        | —          | —     | ~86.0  | ~13.80 | —     | ~19790  | 118 ml (4 oz.) |
| 502-816  | Residual Fuel Oil           | ~3.0     | —          | —     | ~86.0  | ~10.0  | ~0.3  | ~18300  | 118 ml (4 oz.) |

\*Value is not certified

\*\*for information purposes only

# O-Rings

See individual consumable and spares reference cards for precise location of o-rings for most instruments. For exact o-ring sizes, please refer to the drawings on pages 19 and 20.

## AC350, AC500

| Part No. | Location               |
|----------|------------------------|
| 608-624  | Vessel Lid             |
| 608-750  | Filter                 |
| 760-224  | Oxygen Fill Nozzle     |
| 760-359  | Filling Insert         |
| 773-913  | Depressurization Valve |
| 776-562  | Ceramic Washer         |

## AC600

| Part No.    | Location             |
|-------------|----------------------|
| 611-543     | Prep Station Nipple  |
| 621-605-560 | Vessel Cap           |
| 621-605-664 | Check Valve          |
| 772-738     | Prep Station Inserts |
| 773-913     | Electrode Post       |
| 776-562     | Ceramic Washer       |

## AF700

| Part No.    | Location                    |
|-------------|-----------------------------|
| 625-501-149 | Furnace Tube                |
| 625-501-161 | Periscope Window            |
| 625-501-284 | Periscope                   |
| 625-501-430 | Thermocouple/Gas Inlet Tube |
| 760-841     | Filter Tube                 |
| 765-976     | Filter Tube                 |
| 772-520     | Balston Filter              |

## AMA254

| Part No.    | Location           |
|-------------|--------------------|
| 614-822-106 | Carrier Gasket     |
| 614-822-108 | Amalgamator Gasket |
| 614-822-117 | Cuvette            |

## FP-528

(See TruSpec, TruSpec Micro, FP-528)

## SC-144DR/S-144DR/C-144

| Part No. | Location              |
|----------|-----------------------|
| 616-068  | Inner Combustion Tube |
| 772-520  | Reagent Tube          |
| 773-320  | Reagent Tube          |
| 783-897  | Outer Combustion Tube |

## SC632, TruSpec S

| Part No.    | Location  |
|-------------|---|
| 606-333     | Lance Tube (SC-432/444, SC632, and TruSpec Sulfur w/o Autoloader) |
| 611-476     | Inner Combustion Tube   |
| 611-477     | Outer Combustion Tube   |
| 772-520     | Reagent Tube/Particle Filter                                      |
| 773-320     | Reagent Tube  |
| 625-401-301 | Purge Tube (SC632 and TruSpec Sulfur with Autoloader)             |
| 625-401-302 | Lance (SC632 and TruSpec Sulfur with Autoloader)                  |

## TFE2000

| Part No. | Location                   |
|----------|----------------------------|
| 611-541  | HVR Drive Piston           |
| 611-543  | HVR Block Tubing Assembly  |
| 611-544  | Vial Seal Gasket           |
| 611-790  | Upper Extraction Piston    |
| 771-372  | Lower Extraction Piston    |
| 773-913  | Vial Block Transducer Seal |

# O-Rings

See individual consumable and spares reference cards for precise location of o-rings for most instruments. For exact o-ring sizes, please refer to the drawings on pages 19 and 20.

## TruMac N

| Part No.    | Location                                   |
|-------------|--|
| 601-442     | Loader Arm Assembly                        |
| 608-089     | Pinch Valve                                |
| 609-271     | Radial Seal (Loader Arm)                   |
| 611-476     | Inner Combustion Tube                      |
| 611-477     | Outer Combustion Tube                      |
| 612-340     | Pre-Chiller                                |
| 625-602-297 | Doser Stem                                 |
| 625-602-319 | Cup Seals (Purge Block)                    |
| 763-379     | Condensing Block (TE Cooler)               |
| 772-520     | Lance/Loader Arm Assembly/<br>Reagent Tube |
| 760-226     | Pinch Valve                                |
| 774-613     | Loader Arm Assembly                        |
| 778-116     | Ballast Piston                             |
| 778-120     | Gasket                                     |
| 805-481     | Purge Block                                |

## TruSpec, TruSpec Micro, FP-528

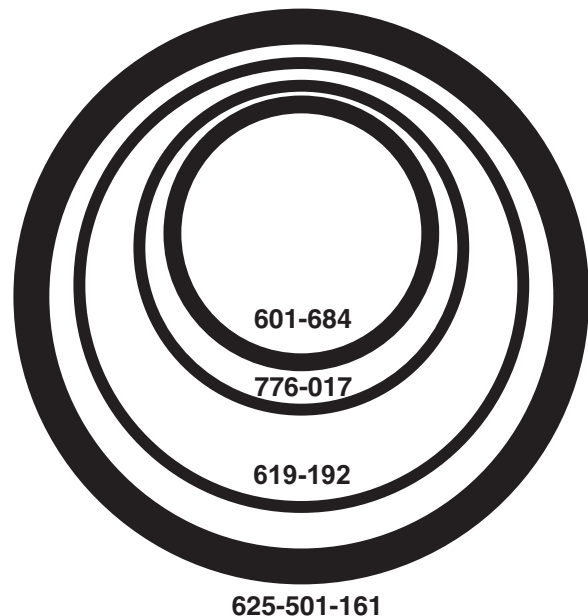
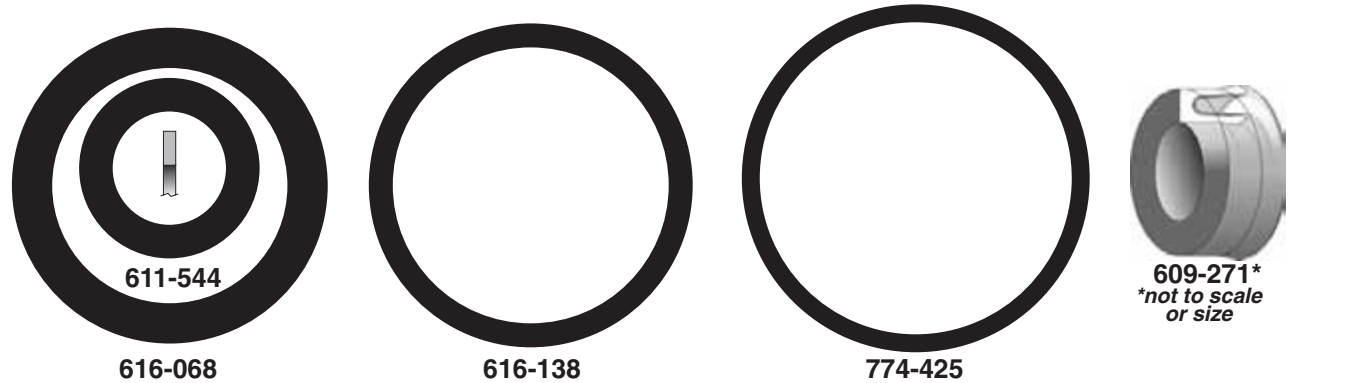
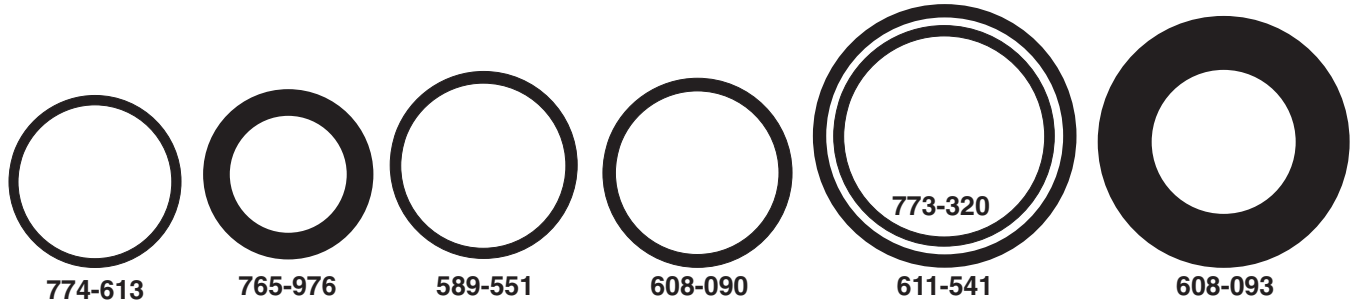
| Part No. | Location                     |
|----------|------------------------------|
| 589-551  | Sliding Block                |
| 601-442  | Reduction Tube/Lance Tube    |
| 601-504  | Loading Head                 |
| 601-505  | Load Head                    |
| 601-684  | Slide Block                  |
| 601-939  | Cylinder Block               |
| 612-340  | Pre-Chiller                  |
| 616-138  | Secondary Furnace            |
| 617-136  | Load Head                    |
| 619-192  | Lance Shield                 |
| 702-557  | Secondary Furnace Mount      |
| 763-379  | Condensing Block (TE Cooler) |
| 765-976  | Filter Tube                  |
| 771-407  | Load Head Plunger            |
| 772-269  | Valve Stem                   |
| 772-520  | Reagent Tube                 |
| 772-738  | Heater Assembly              |
| 772-910  | Piston                       |
| 773-913  | Sample Block                 |
| 774-253  | Aliquot Manifold             |
| 774-425  | Slide Block                  |
| 776-017  | Ballast Retainer Plate       |
| 778-116  | Ballast Assembly             |
| 778-120  | Gasket                       |
| 780-831  | Lance                        |

## TruSpec Micro O

| Part No. | Location             |
|----------|----------------------|
| 589-551  | Sliding Block        |
| 608-089  | Inner Pyrolysis Tube |
| 608-090  | Outer Pyrolysis Tube |
| 608-091  | Outer Pyrolysis Tube |
| 608-093  | Interface Block      |
| 772-910  | Piston               |
| 774-283  | Cylinder             |
| 774-613  | Cylinder             |

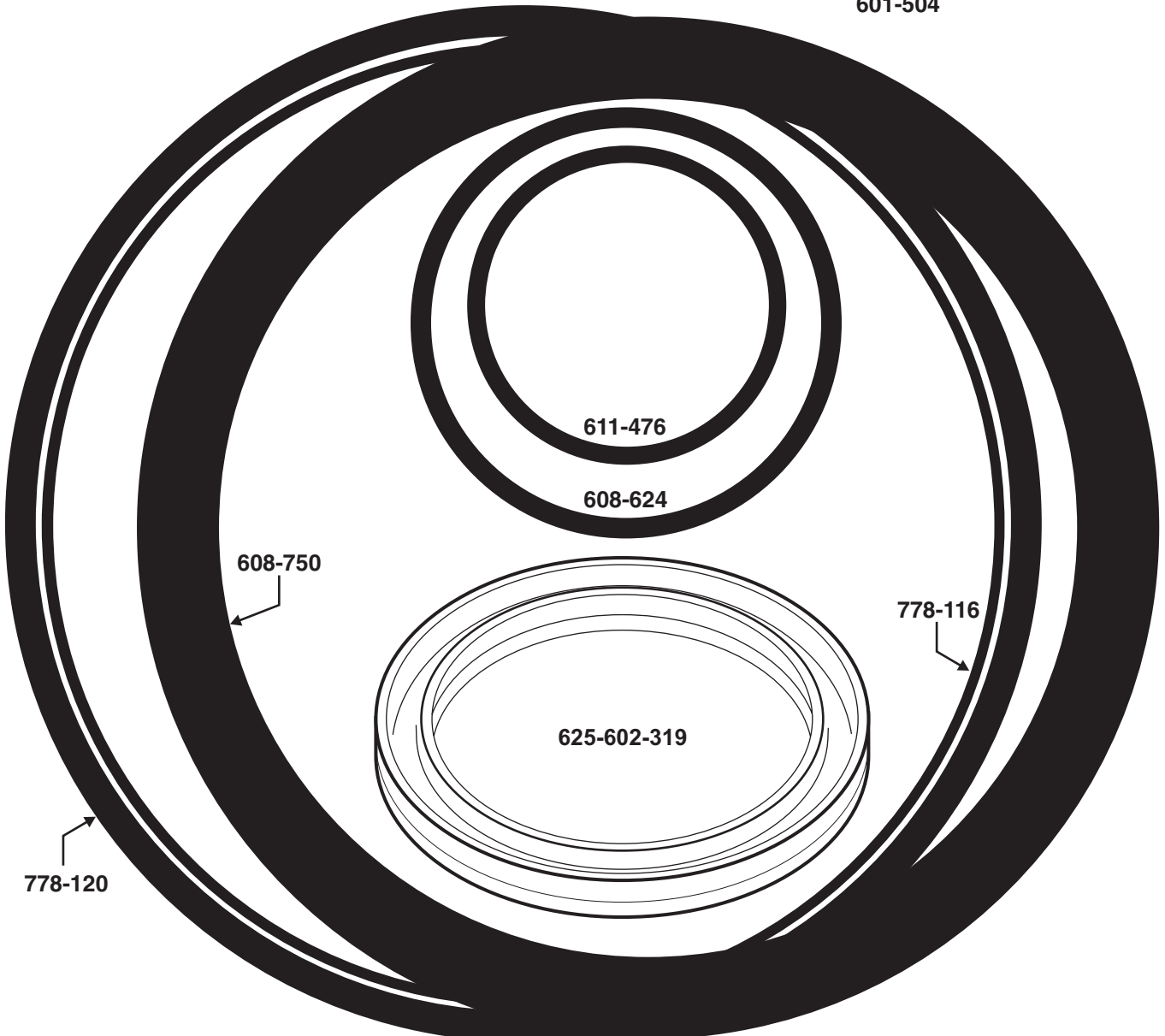
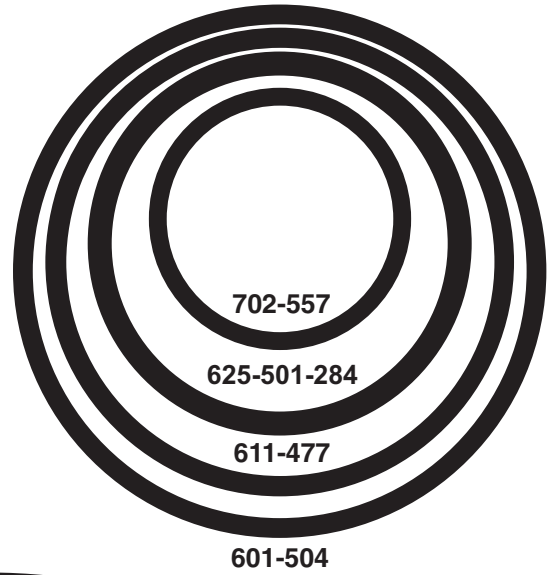
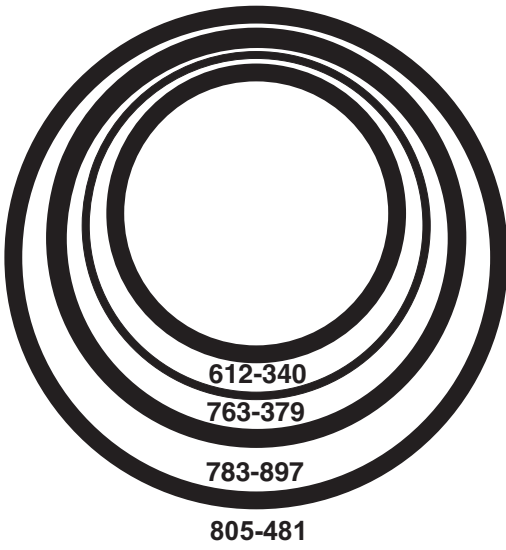
# O-Rings

Drawings to scale.



# O-Rings

Drawings to scale.



# Miscellaneous Operating Accessories

Refer to pages 24 and 25 for a visual reference of the miscellaneous operating accessories.

## Ash Fusion Determinators

|             |                                 |
|-------------|---------------------------------|
| 501-233     | Ceramic Aluminum Adhesive       |
| 502-010     | Dextrin Solution                |
| 613-564     | T-Clamp Expansion Tool          |
| 616-504     | Filter (0.01 micron)            |
| 625-501-328 | Replacement Heating Element Kit |
| 625-501-361 | Replacement Furnace Tube Kit    |
| 625-501-363 | Ash Cone Tray Tool              |
| 625-501-431 | Door Interlock Bypass Key       |
| 625-501-471 | Test Pin Tray                   |
| 633-101-441 | Furnace Thermocouple            |
| 761-929     | Tongs                           |
| 776-957     | Ash Cone Mold (ASTM 1857)       |
| 776-958     | Spatula                         |

## Calorimeters

|             |                                    |
|-------------|------------------------------------|
| 501-241     | Vacuum Grease                      |
| 502-051     | Tweezers, Curved Fine Point        |
| 502-296     | Filter, 100/pkg (AC500)            |
| 502-460     | Fixed Wire Igniter, 5/pkg (AC500)  |
| 502-461     | Cotton Thread Fuse, 10 cm, 375/pkg |
| 502-462     | Fuse Wire, 10 cm, 375/pkg          |
| 601-980     | Wash Bottle                        |
| 608-671     | Inline Filter (AC500)              |
| 621-322     | Pellet Press                       |
| 621-605-517 | Vessel Lid Removal Tool (AC600)    |
| 621-605-744 | AC600 Prep Station Flush Adapter   |
| 621-605-750 | Vessel Tool Kit (AC600)            |
| 621-605-777 | AC600 Wire Fuse Vessel Conversion  |
| 621-605-803 | Fixed Wire Igniter, 5/pkg (AC600)  |
| 621-265     | Cleaning Brush                     |
| 621-657     | Filter Cartridge, 1 micron (AC600) |
| 633-101-923 | Combustion Vessel Holder (AC600)   |
| 762-515     | O-Ring Removal Tool                |
| 774-204     | Stainless Steel Crucibles, 10/pkg  |
| 774-649     | Crucible Cleaning Brush            |
| 776-978     | Glass Scoop                        |

## Carbon/Hydrogen/Nitrogen/Sulfur/Oxygen Determinators

|         |                               |
|---------|-------------------------------|
| 501-241 | Silicone Grease               |
| 501-614 | Spatula                       |
| 502-023 | Funnel                        |
| 502-028 | Tweezers, Straight            |
| 502-051 | Tweezers, Curved              |
| 502-213 | Leak Detection Solution       |
| 601-964 | Crimping Pliers               |
| 601-982 | Spatula                       |
| 604-373 | Small Sample Cup Holder       |
| 604-378 | Tweezers, Curved              |
| 604-398 | Large Sample Cup Holder       |
| 604-493 | Cap Holder                    |
| 604-538 | 15-Micron Filter              |
| 606-114 | Crucible Extractor            |
| 608-135 | Pyrolysis Tube Extractor Tool |
| 616-310 | Vacuum Cleaner Attachment     |
| 775-306 | 10 mm Screen Filter           |
| 775-307 | Filter Tool                   |
| 778-321 | Lance Extractor Tool          |
| 778-405 | Sample Storage Block          |

## Mercury Analyzers

|             |                     |
|-------------|---------------------|
| 614-822-101 | Small Boat Loop     |
| 614-822-103 | Beam Boat           |
| 614-822-104 | Spoiler             |
| 614-822-107 | Joint Tube          |
| 614-822-108 | Amalgamator Gasket  |
| 614-822-109 | Output Tube         |
| 614-822-110 | Amalgamator         |
| 614-822-113 | Large Boat Loop     |
| 614-822-121 | Amalgamator Coil    |
| 614-822-129 | Oxygen Needle Valve |
| 614-822-190 | Mercury Lamp        |

# Miscellaneous Operating Accessories

Refer to pages 24 and 25 for a visual reference of the miscellaneous operating accessories.

## Nitrogen/Protein Determinators

|             |  |
|-------------|--|
| 501-241     | Silicone Grease  |
| 501-614     | Spatula  |
| 502-005     | Brush  |
| 502-007     | Tube Cleaner   |
| 502-023     | Funnel   |
| 502-028     | Tweezers, Straight   |
| 502-213     | Leak Detection Solution  |
| 502-450-100 | Quartz Furnace Filter (TruSpec)  |
| 502-476     | 10 ml Vials for DI-PAL Liquid Autosampler/TruSpec (100/pkg)  |
| 502-477     | Screw Tops for 502-476 Vials   |
| 503-032     | Regular Glass Scoop  |
| 601-490-110 | Sample Foiler Kit  |
| 601-981     | Wire Brush   |
| 603-350     | O-ring Installation Tool   |
| 604-373     | Small Sample Cup Holder  |
| 604-378     | Tweezers, Curved   |
| 604-398     | Large Sample Cup Holder  |
| 604-485-110 | Leak Tester Kit  |
| 604-492     | Quick Sampler Kit  |
| 604-493     | Cap Holder   |
| 609-170-110 | Gel Cap Sample Dispenser Includes:<br>502-338 Small Gel Cap (400) 604-373<br>Small Sample Cup Holder for Balance<br>611-255 Plunger Assembly 609-172-020<br>Replacement Tubes (20) |
| 611-844     | Spatula (Macro)  |
| 616-152     | Crucible Extractor Tool  |
| 619-180-110 | Stackable Carousel Assembly (TruSpec)  |
| 619-377     | Bypass Plate (TruSpec)   |
| 619-380     | Vacuum Cleaner Attachment Assembly   |
| 625-067-120 | Heater Element Repair Kit (TruMac)   |
| 762-515     | O-ring Removal Tool  |
| 768-980     | Balston Filter   |
| 775-306     | Secondary Filter   |
| 775-307     | Filter Tool  |
| 778-405     | 10-Sample Storage Block  |
| 801-076     | Duckbill Check Valve for DI-PAL Liquid Autosampler/TruSpec (50/pkg)  |

## Proximate/Thermogravimetric Analyzers

|             |                               |
|-------------|-------------------------------|
| 502-335     | Crucible Foil Liner (500/pkg) |
| 614-442-110 | Large Crucible Turntable      |
| 621-361     | ~5 g Quartz Rod               |
| 761-929     | Crucible Tongs                |
| 776-978     | Glass Scoop                   |
| 778-898     | Crucible Cover Forceps        |

# Miscellaneous Operating Accessories

Refer to pages 24 and 25 for a visual reference of the miscellaneous operating accessories.

## Sulfur/Carbon Determinators

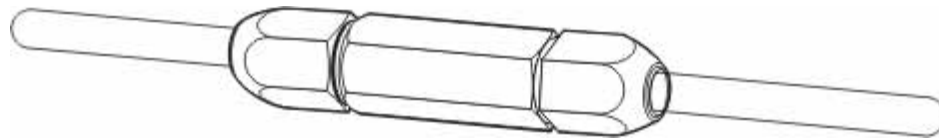
|             |  |
|-------------|--|
| 175-590     | Diaphragm and Flapper Valve Kit  |
| 501-062     | Boat Puller (SC-Series)  |
| 501-241     | Silicone Grease  |
| 501-614     | Spatula  |
| 502-023     | Funnel   |
| 503-032     | Glass Scoop  |
| 606-316     | Outlet Port Adapter  |
| 606-319     | Cable, Wire Braid  |
| 606-320     | Clamps   |
| 606-352     | Autoloader Boat Rack   |
| 606-403     | Adapter Brush  |
| 606-547     | Boat Pull for Autoloader   |
| 606-560     | Hot Plate Tray   |
| 606-563     | Hot Plate Tray Liner   |
| 606-601     | Heating Element Set for SC-400 Series, CR-412, SC-144DR, S-144DR, C-144 (1 set of 4) |
| 613-563     | Braided Cables (short strap) (SC144)   |
| 613-564     | Expansion Tool for Braided Cables  |
| 616-012     | Front Flange   |
| 616-013     | Compress Flange  |
| 616-063     | Boat Puller (SC144DR only)   |
| 625-067-120 | Heating Element Replacement Kit (SC632, TruSpec S Module)                            |
| 761-929     | Crucible Tongs   |
| 768-980     | Balston Filter   |
| 775-859     | Cleaning Brush   |
| 776-978     | Large Glass Scoop  |
| 777-073     | Thermocouple Assembly  |

## Total Fat Determinators

|             |                                   |
|-------------|-----------------------------------|
| 501-081     | Glass Wool                        |
| 502-213     | Leak Detection Solution           |
| 502-327     | LECO-Dry                          |
| 502-329     | Vial (72/pkg)                     |
| 502-815     | Paraffin Sample                   |
| 602-460     | Thimble End Cap Frit              |
| 602-463     | Thimble End Cap                   |
| 602-466     | Thimble Radial Seal (cap)         |
| 602-467     | Funnel                            |
| 602-483     | Peek Cap (thimble end cap insert) |
| 602-485     | Thimble Cap Assembly (6/pkg)      |
| 611-277     | Thimble Cap, Dummy                |
| 611-538     | HVR Wafers                        |
| 611-539     | HVR Assembly                      |
| 611-545     | HVR Body                          |
| 611-553     | HVR Needle Pins                   |
| 611-555     | Thimble Body (3/pkg)              |
| 611-715-101 | Pump Check Valve Replacement Kit  |
| 611-715-102 | Pump Seal                         |
| 611-725     | HVR Actuation Pin                 |
| 611-815     | Tray Assembly Rack                |
| 611-842     | Beaker                            |
| 611-843     | Scoop, Metal                      |
| 611-844     | Spoon, SST                        |
| 611-864     | Wrench (for SST tubing)           |
| 611-890     | Sample Rack (thimble holder)      |
| 611-898     | Brush (modified)                  |
| 611-963     | HVR Plug                          |
| 611-984-101 | Pump Piston (sapphire)            |
| 620-950     | Meat Mixing Tool                  |
| 776-978     | Scoop, Glass                      |

# Miscellaneous Operating Accessories

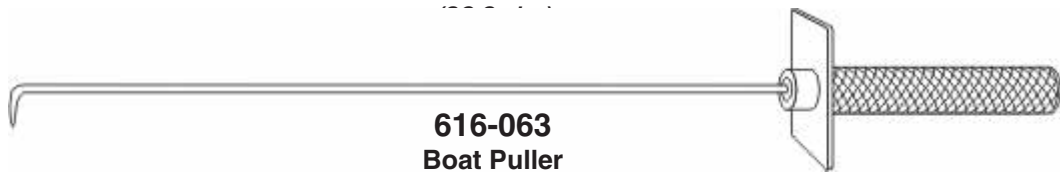
Most commonly used items represented.



**620-950**  
Meat Mixing Tool



**501-062**  
Boat Puller



**616-063**  
Boat Puller  
(SC144DR only)



**502-028**  
Straight Tweezers



**503-032**  
Glass Scoop



**502-051**  
Curved Tweezers



**501-614**  
Spatula



**604-378**  
Curved Tweezers



**601-982**  
Spatula



**761-929**  
Crucible Tongs



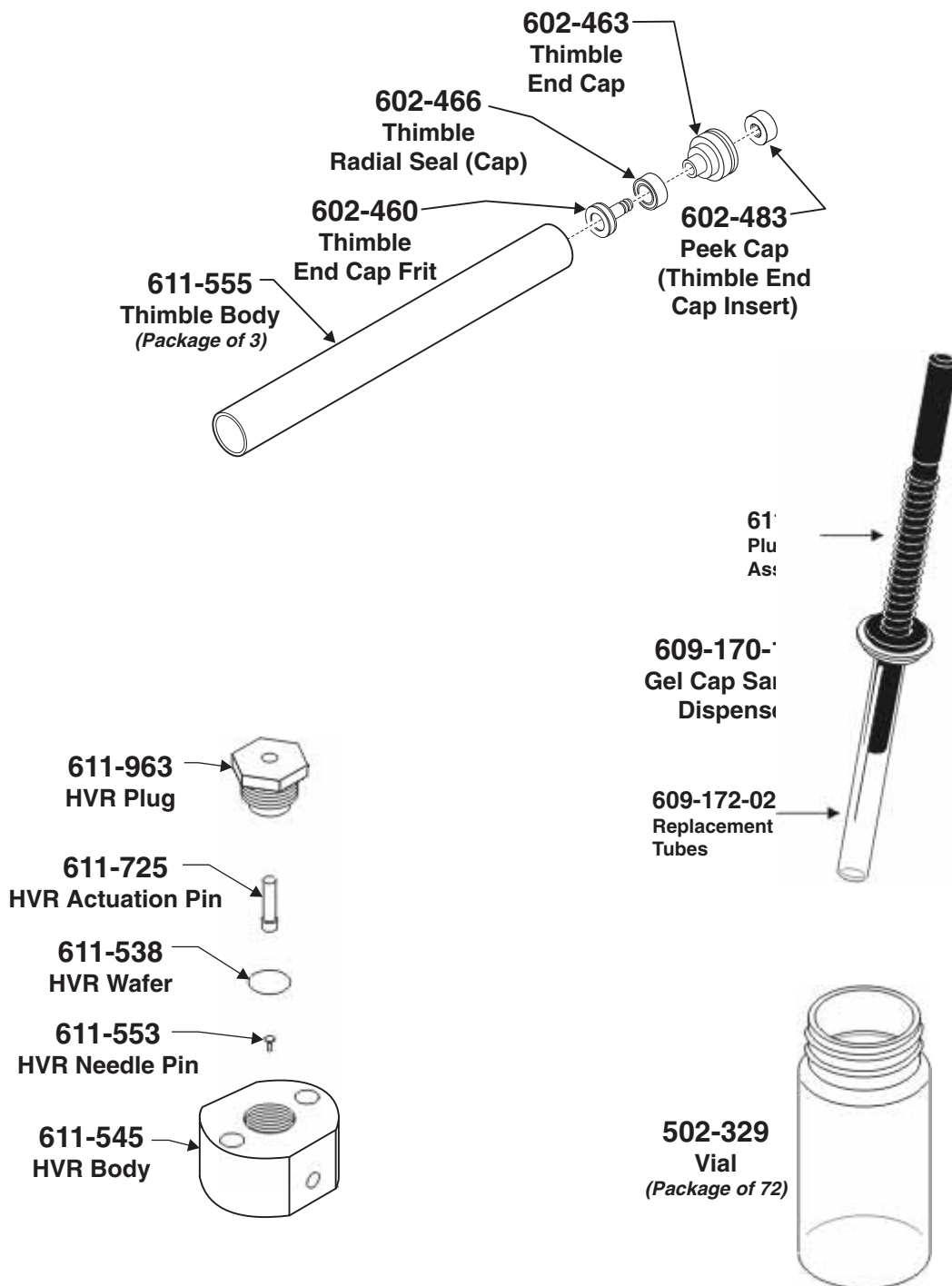
**502-023**  
Funnel



**611-844**  
Spoon

# Miscellaneous Operating Accessories

Most commonly used items represented.



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Much like an automobile, routine checks and maintenance need to be performed regularly on your laboratory instrumentation to keep them in peak operating condition. That is why we have designed Preventive Maintenance Agreements (PMA's) for select LECO instrument models.

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| FP/CNS-2000 Carbon/Nitrogen/Sulfur Determinator (1 visit) | 104-102         |
| SC-432/444 Sulfur/Carbon Determinator (1 visit)           | 104-103-HAZ     |
| SC-144DR Sulfur/Carbon Determinator (1 visit)             | 104-110-HAZ     |
| SC632 Sulfur/Carbon Determinator (1 visit)                | 104-121-HAZ     |
| TFE2000 Total Fat/Oil Determinator (1 visit)              | 104-104         |
| TruMac Macro Nitrogen Determinator (1 visit)              | 104-123-HAZ     |
| TruSpec® Series of Elemental Determinators (1 visit)      | 104-112-HAZ     |
| TruSpec with Sulfur Module Add-On (1 visit)               | 104-122-HAZ     |

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- Hydrogen
- Glow Discharge Spectroscopy
- Metallographic Sample Preparation
- Microstructural Analysis



## **Energy & Fuels** (for more information, request form no. 209-205-002)

- Carbon/Hydrogen/Nitrogen
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- Mercury
- Moisture/Ash/Volatile Matter
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## **Life Sciences** (for more information, request form no. 209-205-003)

- Carbon/Hydrogen/Nitrogen/Sulfur (in micro samples)
- GC-/GCxGC-TOFMS



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- Mercury
- Carbon/Hydrogen/Nitrogen
- Nitrogen (in macro samples)
- Moisture/Ash/Volatile Matter
- Fat/Oil
- GC-/GCxGC-TOFMS
- GCxGC-FID/ECD



## **Environment & Agriculture** (for more information, request form no. 209-205-005)

- Mercury
- Carbon/Hydrogen/Nitrogen
- Nitrogen (in macro samples)
- Moisture/Ash/Volatile Matter
- Fat/Oil
- GC-/GCxGC-TOFMS
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